Roll No. ..... Total Pages : 2

BT-5/D-22 **45245**

INFORMATION THEORY AND CODING

Paper-EC-307-A

Time : Three Hours] [Maximum Marks : 75

Note : The students are required to attempt *five* questions in all, selecting at least *one* question from each unit.

UNIT-I

1. Discuss probability distribution and density functions of a random variable. Describe the various moments of a random process. (15)

2. Define entropy. Compute entropy of discrete binary source with probability p for 0 and 1 – p for 1. Draw graph between Entropy and p. (15)

UNIT-II

3. Discuss various types of codes. Compare variable length codes with fixed length codes with the help of suitable example. (15)

4. Define Channel Capacity. Define and prove Shannon's noise coding theorem. (15)

UNIT-III

5. Consider a DMS with seven symbols with probabilities {0.35, 0.33, 0.13, 0.07, 0.03, 0.04, 0.03}. Determine the Huffman Code for this source. Compute the efficiency of the code. (15)

6. Define Mutual Information. Compute its expression and discuss its properties. (15)

UNIT-IV

7. Consider the following generator Matrix :

   G = [10100 ; 10011; 01010].

   (a) Generate all possible code words. (5)

   (b) Find the parity check matrix H. (5)

   (c) What is minimum distance of this code? (5)

8. Discuss Trellis Diagram of Convolution Codes and Viterbi Decoding. (15)